POPULATION STUDY OF THE FAN MUSSEL *PINNA NOBILIS* L., IN TWO AREAS OF SARDINIA (W-MEDITERRANEAN)

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Abstract
We investigate the population ecology and conservation status of the endangered Mediterranean bivalve *Pinna nobilis*. Spatial distribution, size structure, shell orientation and valve colonization by epibionts were the main descriptors investigated in two areas of Sardinia: S. Antioco island and the Gulf of Oristano (Sardinia, western Mediterranean).
Keywords: Bivalves, Endemism, Conservation, Tyrrhenian Se

Introduction
The fan mussel, *Pinna nobilis* L., is an endemic Mediterranean species considered to be endangered, whose preservation is urged mainly through the Barcelona Convention and the Habitats Directive. There has been a knowledge-gap in the ecological status of the populations and also in the response to the enforcement of conservation measures, particularly in the insular areas as well as the north African countries [1]. The fan mussel has historically been harvested for different purposes: human consumption, shell collection and for the production of "sea silk" from byssus. In Sardinia (W Mediterranean) were known four main critical areas characterized by large fan mussel beds: the Gulf of Alghero (NW coast), the Gulf of Olbia (NE coast), S. Antioco island (SW coast) and the Gulf of Oristano (W coast). In order to assess the conservation status of this species an investigation started in 2008. Here we present the main results from two areas studied.

Material and Methods
Underwater visual counts of specimens (live and dead), size measurements (total height in cm), shell orientation (0-360°) and epibiosis of valves (by digital pictures), were collected within a detailed sampling design. Data collected refers to 50 quadrats (10x10 m) randomly replicated and geo-referenced. Density was expressed as the number of specimens/100 m^2. Valve orientation was analyzed by the Rayleigh test, while epibiontic data were analyzed using one-way Analysis of Similarities (ANOSIM) based on differences in the spatial scales.

Results
A total of 530 and 725 specimens of P. nobilis were counted and measured respectively in Gulf of Oristano and S. Antioco island. Specimen densities showed significant differences between the two areas analysed. Density of live + dead specimen varying from 4.42 (± 3.09 SD) to 20.33 (± 6.76 SD) specimens/100 m^2 in Gulf of Oristano; from 1.75 (± 1.22 SD) to 48.67 (± 21.42 SD) specimens/100 m^2 in S. Antioco island. Specifically we found that spatial distribution and shell orientation of specimens depends on local ecological features (Fig. 1-2).

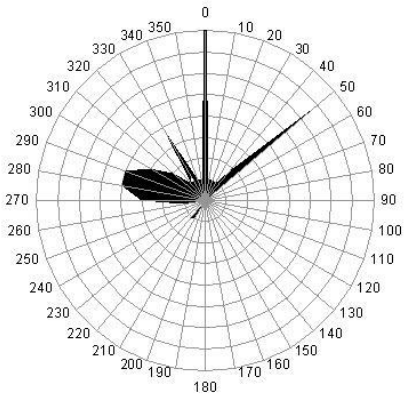

Fig. 1. Rose diagram reporting shell orientation in the the Gulf of Oristano

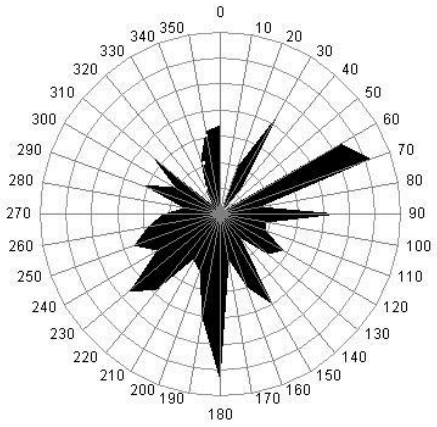

Fig. 2. Rose diagram reporting shell orientation in S. Antioco island

Discussion
The high density values found in both areas to indicate the good health conditions of these populations; moreover values found are much higher than those estimated in other Mediterranean areas [2,3]. *P. nobilis* populations are particularly vulnerable to anthropogenic impacts such as structural changes of seagrass meadows, mechanical impacts due to dredging, anchoring, trawling and entanglement nets and we argue the fact that the protection of populations should match with the protection of the habitat.

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